Preliminary Health Monitoring Of Habitant within Impact Zone Area of Thermal Power Station

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Abstract – The air pollution from coal-fired power plants is large and varied and contributes to a significant number of negative environmental and health effects. When coal is burned in order to generate the electricity, the combustion releases a combination of toxic chemicals into the environment, and thus affects the health of the local habitat population. Coal combustion releases nitrogen oxides, sulfur dioxide, particulate matter, mercury and dozens of other substances known to be hazardous to human health. Coal combustion contributes to smog through the release of oxides of nitrogen, which react with volatile organic compounds in the presence of sunlight to produce ground level ozone, the primary ingredient in smog formation. The health impacts of air pollution from these coal-fired power plants include numerous health issues and frequent asthma attacks. In the future, the amount of power generated from coal will remain high, at least through 2030, and unless we find a better way to manage these power plants, the environmental effects of growing air pollution, greenhouse gas emissions and the cost to human health will all be high. With an objective to carry out assessment of Health damages by combining data on power plant emissions. Total of the 8993 samples from local community were enrolled for the assessment. The present research study was carried out over three years of duration and sample assessment data analysis was distributed in three different phases. Our findings suggest that In case of Pulmonary Function Testing (PFT) , out of 8993 total samples, almost 506 (5.63%) were diagnosed with mild restrictive abnormality, 245 (5.45%) were present with moderate restrictive abnormality and 127 (1.41%) severe restrictive abnormality. With respect to the anemia conditions, out of out of 8993 total samples, almost, 943(10.49%) were observed with low hemoglobin levels. Out of 8993 total samples, vision profile of almost 820(9.12%) samples was presented with matured eye cataract. These findings indicative of the increasing health impacts of the emissions induced air pollution.

Key Words: Coal-Fired Power Plants, Particulate Matter Emission, Air Pollution, Health Damages

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OVERVIEW

Coal remains the main fossil fuel for power generation in India. Atmospheric emissions from the coal-fired power plants mainly sulfur dioxide (SO_2), and nitrogen oxides (NOx), carbondioxide (CO_2) and Mercury (HG) are responsible for the Air pollution. These emissions produced by coal-fired power plants has been linked with several health hazards .Earlier studies confirmed the power plant induced air pollution to increase the incidence of diseases such as chronic bronchitis asthma, heart attacks, and strokes. These health effects result primarily from emissions of particulate matter, sulfur dioxide (SO2), and nitrogen oxides (NOx). [1]At present, India has 84 gigawatts of coal-fired electric generating capacity, 90 percent of which is government owned. Together, India's coal-fired plants emit more than 110,000 tons of particulate matter, 4.3 million tons of SO_2, and 1.2 million tons of NOx per year. [2]

To assess the *air pollution* associated health impact, the present study was conducted at the *coal-fired* power *plants regions of the Maharashtra, India* a where 70 percent of electricity is generated from coal.

MATERIALS AND METHODS

Location and Sample size: Collection of a scientific data regarding the health status of residents within the vicinity of 5 km diameter distance from the power generation plant, almost from five villages from the impact zones area was selected for assessment. Total on 17986 population from the five villages the health assessment monitoring was carried out in three phases over the time span of three years. All the samples were taken the written consent and

details of their preliminary information age sex, height, weight were noted in a predefined format

The health assessment was carried out for the following health parameters

1. Pulmonary Function Testing (PFT) is a complete evaluation of the respiratory system including patient history, exposure to smoke, physical examinations, and tests of pulmonary function. The primary purpose of pulmonary function testing is to identify the association or severity of pulmonary impairment. [3]Analysis for Pulmonary function test (PFT) was recorded under results with categories as

- Category 1: PFT Mild Restrictive Abnormality
- Category 2: PFT Moderate Restrictive Abnormality
- Category 3: PFT Severe Restrictive Abnormality
- Category 4: PFT Normal

2. Anemia is usually defined as a decrease in the amount of red blood cells (RBCs) or hemoglobin in the blood. It can also be defined as a lowered ability of the blood to carry oxygen which function is mediated by RBCs. Anemia is typically diagnosed on a complete blood count. Apart from reporting the number of red blood cells and the hemoglobin level, the automatic counters also measure the size of the red blood cells by flow cytometry, which is an important tool in distinguishing between the causes of anemia. [4] Analysis for anemia (Hemoglobin Level) was carried out and results were categories as

- Category 1: Low Hemoglobin
- Category 2: Normal Hemoglobin

3. Analysis of the Vision was done in particular to detect cataract. Vision deficiency, is the inability or decreased ability to see, or perceive clear vision, differences, under normal lighting conditions. A cataract is a clouding of the lens in the eye leading to a decrease in vision. Symptoms of eye cataract may include faded colors, blurry vision, halos around light, trouble with bright lights, and trouble seeing at night. This may result in trouble driving, reading, or recognizing faces. [5] Poor vision may also result in an increased risk of falling and depression. Cataracts are the cause of half of blindness and 33% of visual impairment worldwide [6] Analysis for Vision was carried out and the recorded results were categories as

- Category 1: Mature Cataract
- Category 2: Normal Vision

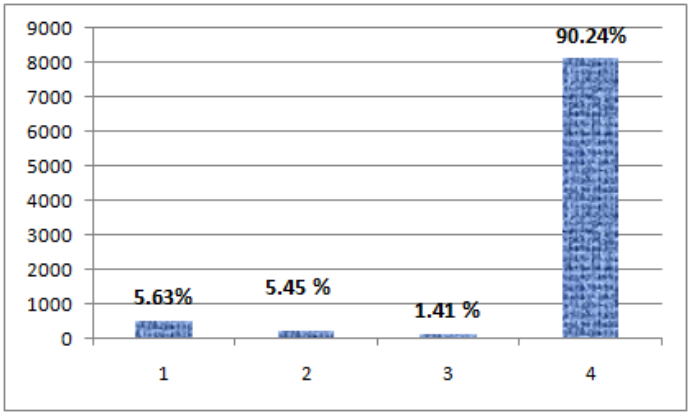
RESULTS

The health assessment was carried out among the 8993 sample population from the impact zone with respect to the three major health parameters as Pulmonary Function Testing (PFT), analysis for anemia (Hemoglobin level, and analysis of the vision in particular the development of the eye cataract. The findings of the analysis were as illustrated below (Dig.1,2 & 3)

Pulmonary Function Testing (PFT)

The results of the Pulmonary function test (PFT) was recorded in the four categories as

- Category 1: PFT Mild Restrictive Abnormality
- Category 2: PFT Moderate Restrictive Abnormality
- Category 3: PFT Severe Restrictive Abnormality
- Category 4: PFT Normal



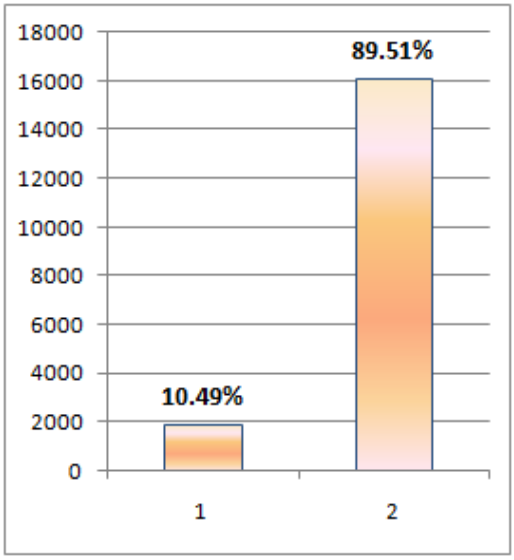
Dig. 1 Results of the Pulmonary Function tests

The cases of Pulmonary Function Testing (PFT), out of 8993 total samples, almost 506 (5.63%) were diagnosed with mild restrictive abnormality, 245 (5.45%) were present with moderate restrictive abnormality and 127 (1.41%) severe restrictive abnormality.

Analysis for anemia (Hemoglobin Level)

- Category 1: Low Hemoglobin

- Category 2: Normal Hemoglobin

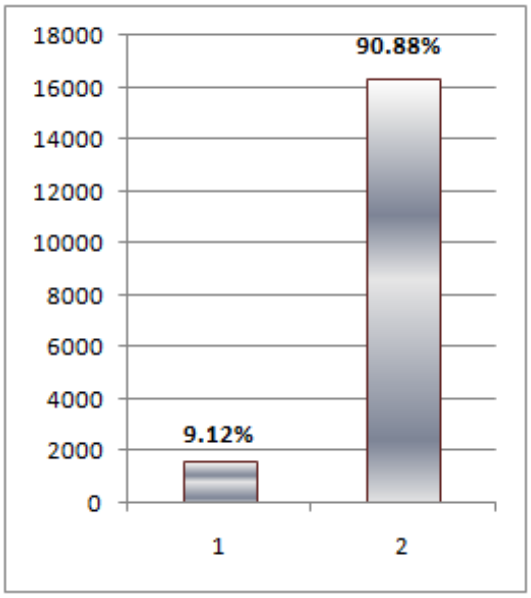


Dig. 2 Results of the Anemic Conditions

With respect to the anemia conditions, out of out of 8993 total samples, almost, 943(10.49%) were observed with low hemoglobin levels.

Analysis of the Vision

- Category 1: Mature Cataract
- Category 2: Normal Vision



Dig. 3 Results of the Vision Profile Analysis

Out of 8993 total samples, vision profile of almost 820(9.12%) samples was presented with matured eye cataract.

CONCLUSION

Emissions of greenhouse gases and other pollutants are increasing in India with the increasing demand for electricity. The aspiration for rapid economic growth leading to rapid industrialization coupled with accelerated urbanization and mechanization of agriculture has been responsible for this increasing demand of electricity ever since the independence. Throughout the world, thermal power plants, in addition to emitting greenhouse gases, are a major source of local pollution and health damages. This study provides an preliminary health assessment and impact on the habitant within impact zone area of the pollution generated through the thermal Power generation units.

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